



LETTER TO THE EDITOR

Management of narcolepsy during COVID-19: a challenge or an opportunity?

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Dear Editor,

The coronavirus disease 2019 (COVID-19) is a life-threatening pandemic and has rapidly emerged as a global public health emergency. A series of measures were implemented to prevent the spread of the virus, among which social distancing was the most important strategy. However, social distancing may disrupt different aspects of life and give rise to health-related problems, such as sleep disorders and psychological distress, among the general population [1].

Narcolepsy is a rare sleep disorder characterized by the main symptom of excessive daytime sleepiness (EDS). This central nervous system hypersomnia is associated with an increased risk of work- and traffic-related accidents and can have a significant impact on the quality of life. To date, there is no cure for narcolepsy. As such, patients with narcolepsy need long-term treatment strategies to manage their symptoms. Currently, the available treatment methods include pharmacotherapy and nonpharmacological strategies. Behavioral strategies (e.g. scheduled daytime naps and a regular sleep schedule) could improve daytime sleepiness and facilitate adherence to medication,

playing an important role in the clinical management of narcolepsy [2, 3]. During the COVID-19 outbreak, patients with narcolepsy may fail to get their prescription due to the restrictions on public transport, home confinement, and fear of cross-infection in hospitals [1], resulting in drug discontinuation. On the other hand, the extended period of home confinement during the pandemic may provide more opportunities for them to sleep and cause the alternations of their sleep pattern. Thus, we were interested in investigating the impact of the COVID-19 pandemic in patients with narcolepsy.

We conducted a retrospective survey from May 27 to June 17, 2020 among the outpatients attending Sleep Medicine Center in West China Hospital of Sichuan University and those attending Neurology clinic in TangDu Hospital of Fourth Military Medical University. A total of 40 patients with narcolepsy and 40 age-sex matched healthy controls were recruited in this study. All participants completed a questionnaire on demographic features, schedule of daily activities, and clinical characteristics (before and during COVID-19), and were assessed by the self-report measures including Insomnia Severity Index (ISI), 7-item

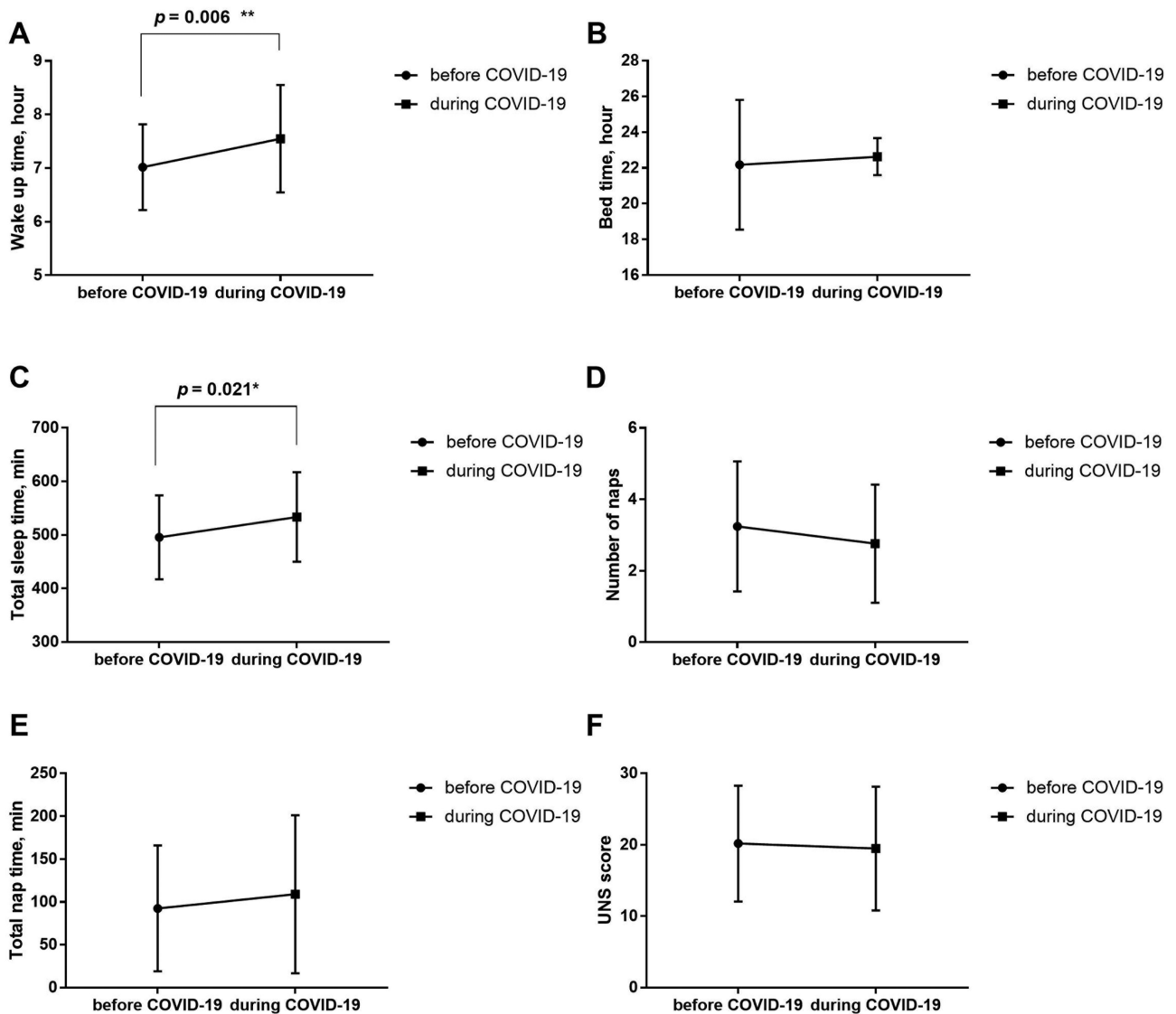


Figure 1. The comparisons of sleep variables and UNS score before and during the COVID-19 pandemic in narcolepsy patients. (A) Wake up time. (B) Bed time. (C) Total sleep time. (D) Number of naps. (E) Total nap time. (F) UNS, Ullanlinna Narcolepsy Scales, * $p < 0.05$.

Generalized Anxiety Disorder (GAD-7), 9-item Patient Health Questionnaire (PHQ-9), Epworth Sleepiness Scale (ESS), and Ullanlinna Narcolepsy Scale (UNS).

Among the recruited patients with narcolepsy ($n = 40$), 28 (70.0%) were male, and the mean age was 20.15 ± 9.90 years (range: 7–59 years). There were no significant differences in age, sex, marital status, education level, and regular schedule of daily activities between narcolepsy patients and healthy controls. However, the patient group were significantly more likely to report daytime sleepiness (ESS > 10: 72.5% vs. 25.5%), insomnia (ISI > 7: 55.0% vs. 27.5%), and depression (PHQ ≥ 5 : 67.5% vs. 22.5%) (all $p < 0.05$), as well as anxiety with a statistically significant trend (GAD ≥ 5 : 42.5% vs. 22.5%, $p = 0.094$). Moreover, as compared to healthy controls, the patient group scored significantly higher on the UNS and had longer total nap time before and during the COVID-19 pandemic. Notably, there was no significant difference in total nocturnal sleep time between the two groups (Supplementary Table S1).

Half of the recruited patients ($n = 20$) had disease duration over 3 years, and all of the patients were on regular medication

for the treatment of narcolepsy before COVID-19. The drug treatments included Methylphenidate and Venlafaxine for controlling daytime sleepiness and cataplexy, respectively. During the COVID-19 pandemic, 25 patients (62.5%) had irregular pharmacological treatment and 21 patients (52.5%) stopped their medication due to a shortage of the prescription. Interestingly, only six patients (15.0%) reported worse daytime sleepiness during the pandemic (Supplementary Table S1). There was no significant difference in the UNS score before and during the COVID-19 pandemic in patients with narcolepsy (19.48 ± 8.67 vs. 20.18 ± 8.11 , $p = 0.586$). Comparing the sleep pattern before and during COVID-19, patients with narcolepsy had longer total sleep time (533.55 ± 83.67 min vs. 495.63 ± 78.30 min, $p = 0.021$) and later wake-up time ($7:33 \pm 1:00$ min vs. $7:01 \pm 0:48$ min, $p = 0.006$) after the COVID-19 pandemic. However, there were no significant differences in bed-time, and the number and duration of naps before and during the COVID-19 pandemic (all $p > 0.05$) (Figure 1).

Among those patients with irregular treatment during the COVID-19 pandemic, a minority of the patients had more severe

daytime sleepiness (4/21, 19.0%) and reported experiencing cataplexy (1/15, 6.7%), sleep paralysis (2/11, 18.2%), hallucinations (3/13, 23.10%), and abnormal behaviors during sleep (2/15, 13.3%) more frequently during the pandemic. In addition, there was no significant difference in the UNS score before and during the COVID-19 pandemic. Similarly, these patients had relatively longer total sleep time (552.76 ± 85.08 min vs. 512.67 ± 78.08 min, $p = 0.079$) and significantly later wake-up time ($7:42 \pm 00:53$ min vs. $7:06 \pm 00:51$ min, $p = 0.026$) during the pandemic. There was no significant change in both the total nap duration and the number of naps (all $p > 0.05$).

Our findings showed that most patients did not report aggravation of narcolepsy symptoms even after the discontinuation of pharmacological treatment during the COVID-19 pandemic. Increased nighttime sleep could be an important reason to explain the current findings. Previous studies have pointed out that adequate sleep hygiene and regular naps helped to manage the symptoms in patients with narcolepsy [2, 4]. In particular, nocturnal sleep extension could alleviate both subjective (as assessed by Stanford Sleepiness Scale) and objective daytime sleepiness as evidenced by prolonged mean sleep latency in the multiple sleep latency test (MSLT) in patients with narcolepsy [5]. Our study indicated that the majority of the patients with narcolepsy delayed their rise time and increased the duration of their nighttime sleep during the lockdown period. Moreover, these patients continued to maintain their napping habits during the pandemic.

In the current study, 72.5% of the patients with narcolepsy ($n = 29$) were students who had to study at home via online learning during the pandemic. The significant change in their schedule was the delay of rise time. Previous studies have indicated that a modest delay in school start time could result in increased total sleep time and better mood and daytime behaviors in students [6, 7]. Although patients with narcolepsy had more mood disturbances and poorer sleep than healthy controls, only 7.5% of the patients ($n = 3$) reported poorer study/work performance during the COVID-19 pandemic. Therefore, delaying rise time and reducing the academic burden might benefit the patients with improving their narcolepsy symptoms.

Although the COVID-19 pandemic brings considerable challenges to the treatment of narcolepsy, it also provides a unique opportunity for implementing behavioral strategies in patients with narcolepsy. Our findings indicate that the strategies of delaying rise time, increasing nighttime sleep duration, and regular naps could potentially improve the patients' symptoms. Given that currently the treatment options for patients with narcolepsy remain limited, this study highlights the importance of utilizing

nonpharmacological interventions in the clinical management of narcolepsy.

Ethics approval

This study was approved by the ethics committees of West China Hospital in Sichuan University and TangDu hospital of Fourth Military Medical University, respectively.

Supplementary material

Supplementary material is available at *SLEEP* online.

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Conflict of interest statement. None declared.

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